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ABSTRACT

This study supports the claim that environmental factors in early intervention programs can positively affect the development of early communicative behaviors in infants. A sample of 20-month-old infants from low socioeconomic backgrounds and at risk for mental retardation was randomly divided into a day care intervention group and a control group. Additionally, a middle class comparison sample was formed. Each infant was observed with his or her mother in two standardized settings: (1) a free play setting in which infant-initiated "showing" communications were recorded and (2) an experimental setting in which "requesting" communications were elicted and recorded. Results indicate that high risk infants attending day care intervention programs initiated communicative behaviors to their mothers more often than did infants receiving no day care intervention. Moreover, the frequency of the day care group's communicative behaviors was not significantly different from that in the middle class comparison sample. The developmental level at which the high risk day care infants initiated "showing" and "requesting" communicative acts was significantly more advanced than that of the high risk infants not attending day care intervention. The high risk day care infants' "requesting" communicative acts did not differ from those of the middle class sample. (Author/RH)

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The effects of day care intervention on the use of intentional communicative behaviors in socioeconomically depressed infants

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Research evidence from early intervention studies with high-risk infants indicate that sharp declines in measured intelligence occur during the time infants are learning to talk--18 to 24 months of age. There is increasing indication that problems with the process of developing language may account for at least part of the subsequent delay in high-risk children. In order to determine the specific processes that may be influencing the development of these children, an investigation of the effectiveness of day care intervention for promoting the development of early communicative behaviors in a group of 20 month old infants at risk for mental retardation.

Subjects and Procedure

The sample consisted of two groups from low socioeconomic backgrounds and had been randomly divided into either a day care intervention group (with 14 infants) or a control group (with 12 infants). The third group of 14 infants were selected from county birth records and represented a middle class comparison sample.

Each infant was observed with his or her mother in two standardized settings. The first setting consisted of a free play interaction between the infant and his or her mother in order to obtain information on the infant's intentional use of the "showing" function of communications.

Mothers and their infants were brought into the room and told that we were interested in how children play with their mothers and that they were to use the next 20 minutes as if they had 20 minutes of free time at home. From this free play interaction session information was obtained on how the infant used nonverbal behaviors, vocalizations and words to communicate intentionally to their mother using the "showing" function of communications. That is, whenever the infant obtained the

mother's attention by showing, giving something to her, vocalizing to her, or talking, we scored the communicative attempt into one of four developmentally based categories, as described by Snyder (1976).

The four categories of intentional communications under the "showing" function is developmental order were the following:

1. Showing off. This behavior was coded when the infant performed or acted in such a manner as to obtain the mother's attention by using his own behavior as the focus of attention and resulted in the mother smiling or laughing.
2. Giving, showing and/or pointing. This behavior was coded when the infant used an object to extend to the mother in order to get the mother's attention. This was most often accompanied by a simultaneous vocalization and looking at the mother's face or hands.
3. Ritualized signal. This behavior was coded whenever the infant first intentionally obtained the mother's attention, by looking at the mother and vocalizing, or by going over to the mother and tapping her leg, and then, bringing the mother's attention to the object.
4. Linguistic symbol. This category was coded when the infant used a linguistic symbol to communicate with the mother in order to get the mother to attend to the object of interest.

A measure of the proportion of intentional communicative attempts within each category was obtained for each infant, as well as the frequency with which the infant initiated a communicative act.

The second procedure consisted of the administration of an experimental task by the experimenter to the infant with the mother present, in order to obtain information on the infant's intentional use of the "requesting" function of communications. Stimulus toys were presented that would optimize the communicative situation

and induce the baby to "request" them from the experimenter, such as a glass of milk, a locked container of cookies, a small baby doll with a plastic bottle, a toy drum, toy cars and a pail of plastic blocks.

The experimental communication task was similar to one used by Snyder (1976). The procedure for this task consisted of placing the infant in a position such that he would be more likely to request adult assistance in obtaining the stimulus items presented. The infant was placed at the semi-circular table in the small chair.

The item was placed on the small table out of the infant's reach. The experimenter brought the attention of the infant to the item and then responded to any attempt by the infant to communicate the desire for the adult to give him the item.

The request function of communication consisted of commands or requests by the infant to the mother or experimenter in order to attain an object or require the mother or experimenter to act.

As with the "showing" function, the "requesting" function categories of intentional communications were devised to be consistent with the developmental progression of behaviors identified with this function by Snyder (1976). They consisted of the following four categories:

1. Fussing and reaching for the object. This category of behavior was coded whenever the infant obviously wanted an object, attempted to get it and was unsuccessful, but did not communicate to the mother or the experimenter for help.
2. Reaching for an object, then looking at the experimenter. This category was coded whenever the infant reached for an object, fussed or vocalized, then turned to the experimenter or mother--looking at her or at her hand--while vocalizing. This category was characterized by the infant's recognition that the mother or experimenter could be the means for obtaining the desired goal.

3. Ritualized signal. This category is similar to the third category of the "showing" function, only the infant's intentions are to request assistance of the mother or experimenter. This category was coded when the infant first obtained the attention of the mother or the experimenter, and then made a request by vocalizing and pointing. The infant could obtain the experimenter's attention by touching her hand or tapping her as she was looking away, or could immediately turn to the mother at the sight of the stimulus item.
4. Linguistic symbol. This category was coded whenever the infant used a word that indicated a request or command.

A measure of the proportion of intentional communicative attempts within each of the four categories was obtained for each infant.

Because of the idiosyncratic nature of the mother-infant dyad interactions, a random 5 minute sample from each tape was coded by two independent observers. A 100% agreement level was obtained before proceeding to code the rest of the tape.

Results

Comparison of the Frequency of Communicative Initiations

Table 1 contains the means, SDs, and range for differences between the high risk experimental, high risk control and middle class groups on the total frequency of communicative attempts. The analyses revealed that the high risk experimental group did not significantly differ from the middle class comparison group. Both the high risk experimental and the middle class comparison groups made significantly more spontaneous communicative initiations to their mothers than the high risk control group, who did not receive any day care intervention, $t(22)=2.46$, $p < .02$, and $t(23)= -3.19$, $p < .005$, respectively.

Comparison of the Developmental Distribution of Communicative Initiations

Showing function. As can be seen in Figure 1, for all three groups most of the communicative initiations were found in the second and fourth levels. A test

of proportions (Fleiss, 1973) revealed that the MCC group exhibited a significantly lower proportion of the giving, showing and/or pointing category than either the HRE, $\underline{X}^2_{(1)}=4.74$, $\underline{p}<.05$, or the HRC group, $\underline{X}^2_{(1)}=16.02$, $\underline{p}<.001$. At the same time, the HRE group exhibited a significantly lower proportion of the second category than did the HRC group, $\underline{X}^2_{(1)}=4.52$, $\underline{p}<.05$.

On the other hand, the MCC group exhibited a significantly higher proportion of the linguistic symbol category than either the HRE or HRC groups, $\underline{X}^2_{(1)}=11.29$, $\underline{p}<.001$, and $\underline{X}^2_{(1)}=23.95$, $\underline{p}<.001$, respectively. Again, the HRE group used significantly more communicative instances in this category than the HRC, $\underline{X}^2_{(1)}=4.66$, $\underline{p}<.05$.

Requesting function. Figure 2 shows the proportion of communicative behaviors in each of the four requesting categories for each group. Again, using a chi-square test of proportions (Fleiss, 1973), significant group differences were found for two out of the four categories: (1) reaching for the object--then looking at the mother, and (2) using a linguistic symbol ($\underline{X}^2_{(2)}=12.83$, $\underline{p}<.005$ and $\underline{X}^2_{(2)}=30.10$, $\underline{p}<.001$, respectively). Further analyses revealed that the HRE group did not differ from the MCC group in either of the two categories. Both the HRE and MCC groups exhibited significantly lower proportions in the second developmental category, reaching for object--then looking at the mother, than the HRC exhibited, $\underline{X}^2_{(1)}=8.91$, $\underline{p}<.005$ and $\underline{X}^2_{(1)}=8.99$, $\underline{p}<.005$, respectively. At the same time, both the HRE and the MCC groups used significantly more linguistic symbols than the HRC group when requesting ($\underline{X}^2_{(1)}=18.08$, $\underline{p}<.001$ and $\underline{X}^2_{(1)}=27.92$, $\underline{p}<.001$, respectively) and did not differ from each other.

Discussion

The major hypotheses of this study were confirmed. High risk infants attending day care intervention initiated communicative behaviors more often to their mothers than did infants receiving no day care intervention. Moreover, the frequency of their communicative behaviors was not significantly different from the middle class

comparison sample. The developmental level at which the high risk day care infants initiated "showing" and "requesting" communicative acts was significantly more advanced than that of the high risk infants not attending day care intervention. The high risk day care infants' "requesting" communicative acts did not differ from that of the middle class sample.

There are several plausible reasons why the day care environment facilitated communicative development. The HRC infants did significantly more poorly than the HRE infants on all measures. It may be that the control infants' daily language environment is different from that of the day care environment and does not promote early language and the development of communications.

The HRE infants, on the other hand, were attending day care and were not spending their days at home. They receive language input from trained teachers, which is more similar to the middle class language environment. The day care curriculum goals are to promote growth and development, with a particular orientation toward promoting language interactions. Although the day care environment is a group setting, the teacher's behaviors during the day are oriented toward the infant. Therefore, initiations by the infants in the form of requesting and showing objects to the teacher may be responded to more readily.

The HRE infants' communicative behaviors approached the performance level of the MCC infants on the total frequency of initiative behaviors and the developmental level of the "requesting" function. It is possible that the factors influencing the development of more advanced behaviors are similar in the two environments--the day care setting and the middle class home. The language input may be qualitatively similar. Indeed, Ramey, Farran and Campbell (1979) have found that infants from middle class homes receive more verbal input from their mothers during infancy than either a group of lower socioeconomic status infants attending day care or a randomly assigned control group. This finding suggests that the day care intervention does not alter the behavior of the mothers of infants from low socioeconomic

homes. Given the random assignment to groups, differences in the performance of the infants would have to be attributed to the day care program. The level of communicative functioning between the HRE and MCC groups was significant for the requesting function, which was observed during the experimental task, but not for the showing function, which was observed during the free play setting.

Although there is no data available to characterize the mothers' talk to the infants in this study. It may be that under the mother's influence and control the infant behaves differently. The infant may respond more to the mother's interactional patterns rather than initiating on his own volition, as in the experimental task setting. Since one experimenter administered the experimental task to all the infants, variance due to the interactional style of the adult was minimized for the "requesting" measure.

By measuring the effects of day care intervention after the first two years of development, this study supports the notion that environmental factors can positively affect the development of early communicative development. One would anticipate that subsequent experience in a controlled environment would continue to support the development of these skills. Furthermore, future research should attempt to identify the relationship between early communicative development and later language development, in order to provide evidence of continued differentiation between groups of children experiencing intervention and those remaining at home.

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TABLE 1

Mean Communication Frequency Scores, Standard Deviations and Range of High Risk Control, High Risk Experimental, and Middle Class Comparison Groups During Free Play Situation

Group	N[a]	Total Frequency of Communicative Attempts		
		Mean	SD	Range
High Risk Control	11	13.73	7.34	3-25
High Risk Experimental	13	22.08	9.31	9-39
Middle Class Comparison	14	31.43	19.03	7-78

FIGURE 1

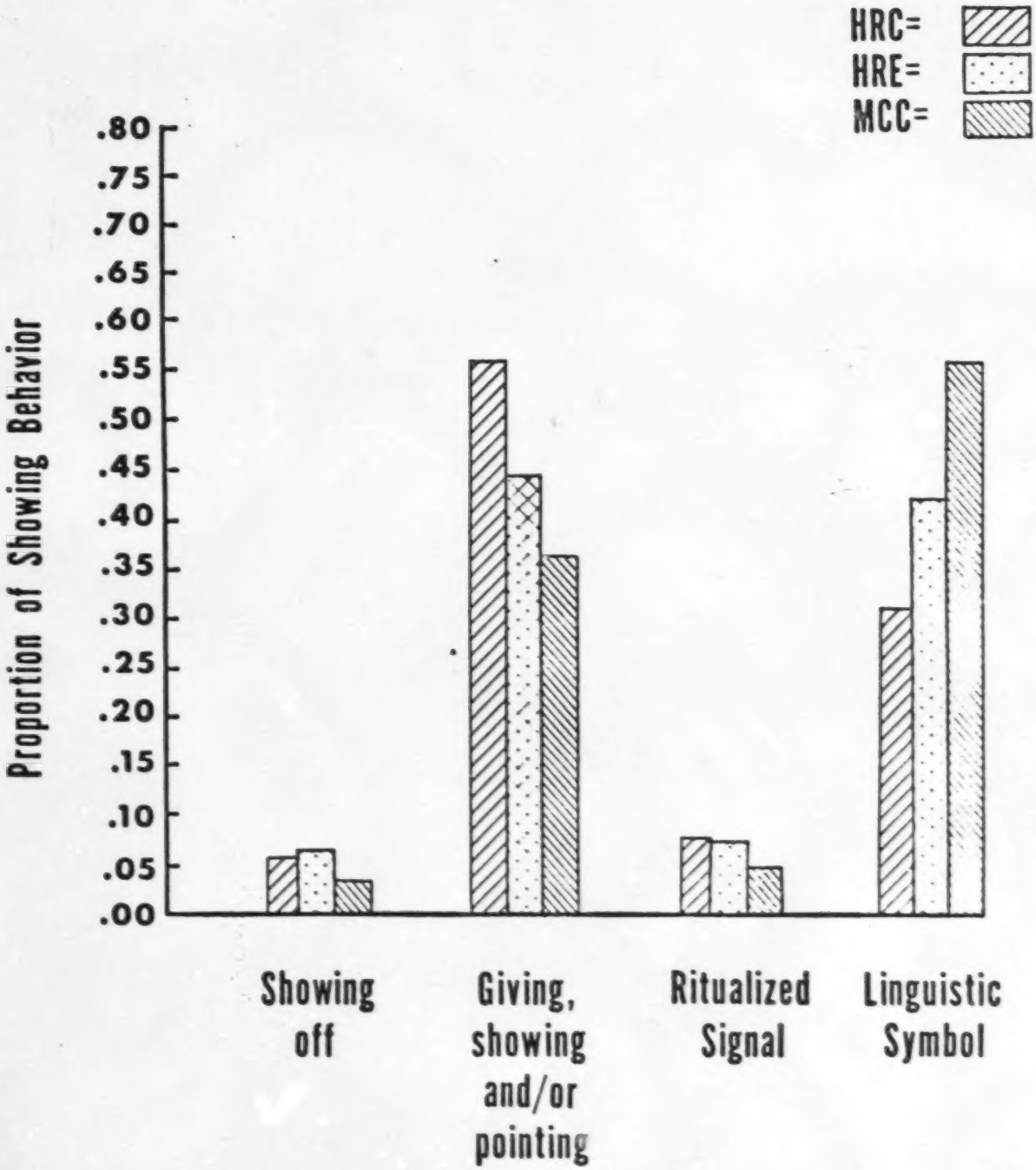
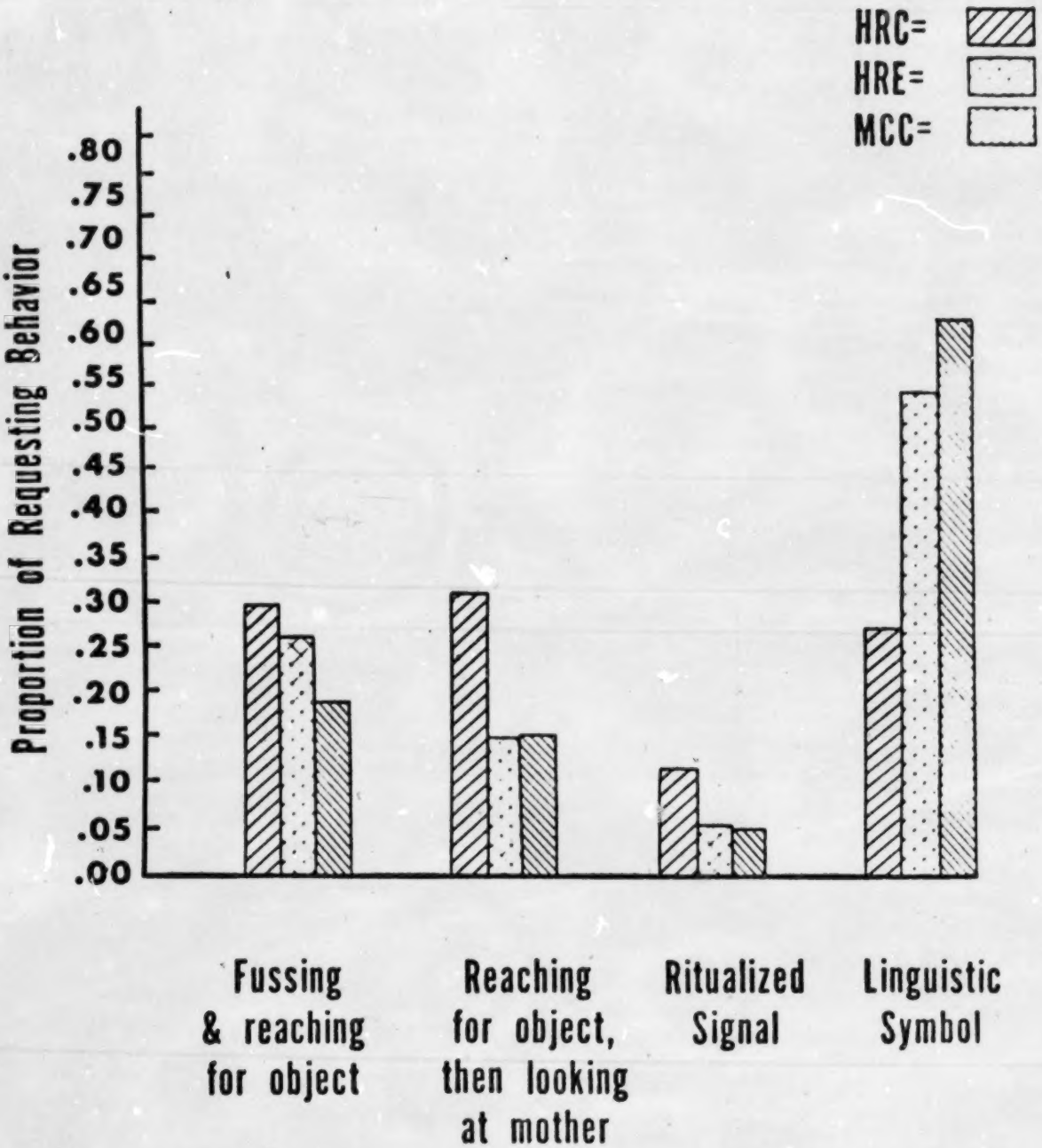

HRC=
HRE=
MCC=
Proportion of Showing Behavior
.80
.75
.70
.65
.60
.55
.50
.45
.40
.35
.30
.25
.20
.15
.10
.05
.00
Showing off
Giving, showing and/or pointing
Ritualized Signal
Linguistic Symbol

FIGURE 2


HRC=
HRE=
MCC=
Proportion of Requesting Behavior
.80
.75
.70
.65
.60
.55
.50
.45
.40
.35
.30
.25
.20
.15
.10
.05
.00
Fussing & reaching for object
Reaching for object, then looking at mother
Ritualized Signal
Linguistic Symbol